

## REMARKS / ARGUMENTS

With this Amendment, claims 1-15, 17-30, 32, and 33 remain in this application. Claim 16 is currently cancelled. Claim 31 has previously been withdrawn from consideration. Claims 32-34 are new.

Claim 12 has been amended to delete the word “lock” (line 2) and replace it with the word —block—. Claim 17 has been amended to delete the word ‘it’ (line 6) and replace it with the word —its—. Claim 17 has also been amended to delete the word “The” (lines 13 and 20) and replace them with the word —the—. Claim 29 has been amended to delete the word “haves” (line 5) and replace it with the word —halves—.

Claims 32-34 have been added to further define the invention. Support may be found in the Specification at Page 3, Lines 18 through 20.

Claims 1, 5, 7, 8, 14, 17-30 have been amended to overcome the Examiner’s 35 U.S.C. § 112 rejections, as described below.

### **Claim Rejections Under 35 U.S.C. § 112:**

Claims 2 and 3 stand rejected under 35 U.S.C. § 112 as being indefinite. The Examiner notes that the term “quickly removed” is vague and indefinite, since the term “quickly” is a relative term. Applicants respectfully direct the Examiner to the Specification, wherein it is stated that ‘This “removable” (preferably quick change) nozzle feature enables an operator to quickly change out dirty or damaged nozzles, preferably in less than 60 seconds, ...’ (*Page 3, Lines 18 through 20*). Therefore, Applicants respectfully contend that the term “quickly” is defined and therefore not vague and indefinite.

Claim 5 stands rejected under 35 U.S.C. § 112 as being indefinite. The Examiner notes that it is unclear as to the relationship of “a pilot flame” (line 3) and “a pilot flame” set forth in claim 1, line 3. Claim 5 has been amended in order to delete the indefinite article “a” with the definite article “the” at line three. This is to establish the proper antecedence for the element.

Claim 7 stands rejected under 35 U.S.C. § 112 as being indefinite. The Examiner notes that “preferably” is considered vague and indefinite. Claim 7 has been amended in order to delete the term “preferably”, thus rendering this rejection as moot.

Claim 8 stands rejected under 35 U.S.C. § 112 as being indefinite. The Examiner notes that “quick” is a relative term, and that “preferably” is considered vague and indefinite. Claim 8 has been amended to delete the term “preferably”. Claim 8 has also been amended to delete the term “quick disconnects” and to replace it with the term “connectors which can be joined or disconnected with a simple movement”.

The original term “quick disconnects” is explained in the Specification as requiring “no tools to couple and uncouple the gas supply conduits”. (Page 5, Lines 2 and 3) Such couplings are well known to one of ordinary skill in the art, and are routinely referred to as “quick disconnects” or, alternatively, “quick connect” couplings. These terms are in such common usage, that the Manual of Patent Classification has designated Class 285, Subclass 148.14 as “Quick Connect or Release”, which is the source from which Applicants derived the replacement term “connectors which can be joined or disconnected with a simple movement”.

Claim 14 stands rejected under 35 U.S.C. § 112 as being indefinite. Claim 14 has been amended to include the term “the ignition source” within the

preamble, thereby establishing antecedence with claim 1, upon which claim 14 is dependent. This amendment to claim 14 also makes the relationship between "the ignition source" (i.e., the element within claim 1 which is being further defined), "an automatic ignition system" (i.e., the *type* of ignition source that is being defined) and "a spark producing means" (i.e., an element of the automatic ignition system). The interrelationship between these three terms is no longer indefinite.

The Examiner has noted that the acronym "IS" and the term "an IS machine" are indefinite. The acronym "IS" stands for "Individual Section", or sometimes "Independent Section", and is a type of glass bottle forming machine. This type of machine was first developed in 1925, is presently widely used in the glass industry, and would be very familiar to one of ordinary skill in the glass making art.

Claim 14 has been amended so that the term "an IS machine" of line 5 now reads "the IS machine", thereby establishing the proper antecedent basis.

Claim 14 stands rejected under 35 U.S.C. § 112 as being indefinite. Claim 14 has been amended to include the term "the ignition source" in the preamble (i.e., to indicate what element in claim 1 is being refined), and therefore make clear the relationships between "an automatic ignition system" (i.e., the *type* of ignition source that is being claimed) and "a spark producing means" (i.e., an element of this automatic ignition system).

Claim 16 stands rejected under 35 U.S.C. § 112 as being vague. Claim 16 has been amended to delete the term "small sample" and replace it with the term "portion". Claim 16 has also been amended to add the term "said mixture of" immediately before the term "fuel gas and oxidant" in order to clarify the antecedent basis for this term. Claim 16 has also been amended to delete the

term “nozzles”, in line 2, and to replace it with the term “injectors”, again clarifying the antecedent basis for this term.

Claim 17 stands rejected under 35 U.S.C. § 112 as being vague. The Examiner states that the relationship between “a hollow tube” (line 6), “the hollow tube” (line 8), and “a first injector” (claim 1) is unclear. The relationship is one wherein both the first injector and the second injectors *are* hollow tubes.

Applicants would like to respectfully direct the Examiner’s attention to Page 10, Lines 15 through 17, wherein it is stated that:

“First injector 38 is essentially a metal *tube*, preferably steel, which fits snugly in a centrally drilled or machined through hole in nozzle 10 body.”

Applicants would also like to respectfully direct the Examiner’s attention to Page 10, Lines 22 through 24, wherein it is stated that:

“Second injectors 40 are preferably metallic *tubes* fitting snugly into respective through holes in nozzle body 11.”

Applicants would like to respectfully direct the Examiner’s attention to Figures 3 and 5, which graphically illustrate what the above two passages describe.

In order to alleviate this ambiguity, Applicants have amended claim 17 to indicate that said first injector is positioned within the central orifice of the nozzle, and said first injector is further comprised of a hollow tube as further defined. Claim 20 has also been amended to include the descriptor “hollow” in front of the term “tube” therein clarifying the antecedent basis for this term.

Claims 17-21 stands rejected under 35 U.S.C. § 112 as having a preamble that lacks proper positive antecedent basis. The preamble of claims 17-21 have been amended to delete the term "Nozzle" and replace it with the term "Apparatus", thereby establishing the proper antecedent basis.

Claim 22 stands rejected under 35 U.S.C. § 112 as being unclear. Claim 22 has been amended to delete the term "head assembly" in the preamble, and to replace it with the term "main gas block". This main gas block is then further defined in the body of the claim. Claim 22 has been amended to delete the indefinite article "a" before the term "highly-carbon-laden gas", and to replace it with the definite article "the", thereby establishing the proper antecedent basis.

Claim 22 has been amended to delete the indefinite article "a" before the term "mixture of fuel and oxidant", and to replace it with the definite article "the", thereby establishing the proper antecedent basis. Claim 22 has been amended to delete the term "section" after the term "support", and to replace it with the term "portion", thereby establishing the proper antecedent basis. Claim 22 has been amended to delete the term "for depositing carbon black". Claim 1 has been amended to add the term "at least one" before the term "nozzle", thereby establishing proper antecedent basis for this term in claim 22.

Claim 23 stands rejected under 35 U.S.C. § 112 as lacking proper antecedent basis. Claim 23 has been amended to delete the term "section" after the term "support", and to replace it with the term "portion", thereby establishing the proper antecedent basis. Claim 1 has been amended to add the term "at least one" before the term "nozzle", thereby establishing proper antecedent basis for this term in claim 23.

Claims 23-29 stands rejected under 35 U.S.C. § 112 as having a preamble that lacks proper positive antecedent basis. The preamble of claims

23-29 have been amended to delete the term "Head assembly" and replace it with the term "Apparatus", thereby establishing the proper antecedent basis.

Claim 25 stands rejected under 35 U.S.C. § 112 as being unclear. Claim 25 has been amended to delete the term "comprising a spark igniter" and replace it with the term "wherein said ignition source is", thereby establishing the proper antecedent basis.

Claim 26 stands rejected under 35 U.S.C. § 112 as being unclear. Claim 26 has been amended to delete the term "the spark igniter" and replace it with the term "said ignition source", thereby establishing the proper antecedent basis.

Claim 29 stands rejected under 35 U.S.C. § 112 as being unclear. Claim 29 has been amended to delete the term "a T-tongue of a mounting plate" and replace it with the term "the heat assembly mounting plate", thereby establishing the proper antecedent basis.

Claim 30 stands rejected under 35 U.S.C. § 112 as being unclear. Claim 30 has been amended to delete the term "a T-tongue of a mounting plate" and replace it with the term "the heat assembly mounting plate", thereby establishing the proper antecedent basis.

Claim 14 has been amended to delete the term "connections" after the term "electronic", and to replace it with the term "controller", thereby establishing the proper antecedent basis with claim 30. Claim 30 has been amended to delete the term "ignitor" after the term "spark", and to replace it with the term "producing means", thereby establishing the proper antecedent basis. Claim 14 has been amended to delete the term "gases", thereby establishing the proper antecedent basis.

**Claim Rejections Under 35 U.S.C. § 103:**

Claims 1,4,5,7-12, 14-16, 22, 24, 25, and 27-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown '120 in view of Nicolas et al '974 and Tischler '773. Applicants respectfully submit that the present invention is not obvious in light of Brown '120 in view of Nicolas et al '974 and Tischler '773.

Claim 16 has been cancelled, thereby rendering this rejection, as it pertains to this claim, moot.

Brown '120 discloses an apparatus for spraying a specific lubricant into molds for a glass forming machine. Nicolas et al '974 discloses an apparatus for the production of carbon black. Tischler '773 discloses a method for the coating of surfaces with soot (carbon black). Brown '120, either alone or in combination with Nicolas et al '974 or Tischler '773, fails to disclose or suggest, at least:

“one or more deflector jets installed at points substantially between the first and second injectors, the deflector jets adapted to direct a portion of said mixture of fuel gas and oxidant toward the ignition source.” (Claim 1 of instant application, currently amended).

Nicolas et al '974 discloses a dual injector apparatus, for which only the acetylene jet delivery is controlled. Nicolas et al '974 discloses an apparatus for which the second injectors (the heating circle) should remain lit continuously during operation of the device. (*Column 2, Lines 10 through 12, and Column 3, Lines 24 through 31*) One of ordinary skill in the art would appreciate that “re-ignition of the pilot flames would be difficult, if not impossible, give the heavy air drafts in a typical glass manufacturing plant.” (*Page 12, Lines 15 through 17 of instant application*). A device for igniting the second injectors (the heating circle) is not disclosed in Nicolas et al '974, either in the specification or in the figures.

A shielding plenum is not disclosed in Nicolas et al '974, either in the specification or in the figures.

In contrast, the present invention has deflector jets positioned within the gas plenum, which allow the pilot flame to be re-ignited during every carbon black deposition cycle.

Tischler '773 discloses a method utilizing a single injector apparatus, which generates soot (carbon black) from an under-stoichiometric combustion. Tischler '773 discloses an method incorporating a screening area to contain the soot, and said screening area also contains a spark initiating device. Tischler '773 discloses a method wherein "the ignition activity of spark plug 10 is initiated simultaneously with the gas supply start (0. s) (sic.) (*translation page 4, last paragraph*) This results in a "detonation-like" reaction within the screening cover, thereby releasing considerable energy "mostly in the direction of area 1 to be coated" (*translation page 5, first paragraph*).

In contrast, the present invention initiates fuel flow to the pilot flame and the deflector jets, *then* discharges the igniter ("a short time later, usually a matter of seconds" (*Page 15, Line 15 of instant application*), *then* indexes the head assembly over the molds, *then* discharge the acetylene (*see generally Page 15, Lines 8 through 20 of instant application, Fig. 8, and claims 30 and 34*). Hence, the carbon black generation and deposition is more precisely controlled, and there is no 'detonation-like" reaction that sends shock waves though the glass molds.

The present invention was designed to overcome three problems that had been identified in the prior art: 1) the igniter had to be isolated from the extreme temperatures generated by the pilot flames, 2) the carbon deposition on the electrode had to be minimized, to keep from grounding the igniter, and 3) the



physics of high velocity gas/oxygen pilot flame during ignition had to be overcome. (*Page 11, Line 16 through Page 12, Line 2, of instant application.*) Neither Nicolas et al '974 nor Tischler '773, alone or in combination, address or solve these three problems.

Since one of ordinary skill in the art would not find that all the elements of claim 1 in the instant application have been either disclosed or suggested by Brown '120, Nicolas et al '974 or Tischler '773, either alone or in combination, it is believed that the basis of rejection deserves reconsideration. Since claim 1 is allowable over the prior art, for the above stated reasons, claims 4,5,7-12, 14-15, 22, 24, 25, and 27-30 are also allowable since they are dependent upon them.

Claims 2 and 3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown '120 in view of Nicolas et al '974 and Tischler '773, and in further view of Tillman '049. Applicants respectfully submit that the present invention is not obvious in light of Brown '120 in view of Nicolas et al '974 and Tischler '773, and in further view of Tillman '049.

Tillman '049 does not remedy the above-mentioned shortcomings of Brown '120, Nicolas et al '974 or Tischler '773 alone or in combination.

The Examiner notes that Tillman '049 teaches that "it is frequently desirable to change the nozzle through which oil is emitted into the reaction flow passage, since the properties of the carbon black being produced can thus be varied (column 1, lines 10-20)." (*Point 6 of Paper Number 10*). This citation from Tillman '049 pertains to the intrinsic difficulties of making carbon black with "carbonaceous make oil." In contrast, present invention is utilizing a "highly-carbon-laden gas" as the source of carbon for the carbon black, which alleviates many problems inherent with a cruder, liquid hydrocarbon fuel.

This citation from Tillman '049 also specifically notes that the purpose for having made this statement about frequent nozzle changes is so "the properties of the carbon black being produced can be thus varied." (*Column 1, Lines 15 to 16*). In contrast, the present invention indicates that this 'quick change' feature is designed to enable "an operator to quickly change out dirty or damaged nozzles, preferably in less than 60 seconds, while the head assembly remains otherwise undisturbed, indexed in position, for example on an IS glass molding machine. (*Page 3, Lines 19 through 22 of instant application*).

The disclosure in Tillman '049 refers to a substantial that needs to be made to the entire carbon black production process, which should be contrasted with the present invention, which refers to a more subtle replacement of an individual portion of the carbon black production process, which can be made without substantially effecting the entire process.

Since one of ordinary skill in the art would not find that all the elements of claims 2 or 3 in the instant application have been either disclosed or suggested by Brown '120, Nicolas et al '974, Tischler '773, or Tillman '049, either alone or in combination, it is believed that the basis of rejection deserves reconsideration and is respectfully traversed.

Claims 6, 13, 23 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown '120 in view of Nicolas et al '974 and Tischler '773, and in further view of Brown '010. Applicants respectfully submit that the present invention is not obvious in light of Brown '120 in view of Nicolas et al '974 and Tischler '773, and in further view of Brown '010.

The Examiner notes that Brown '010 teaches that "it may be advantageous to arrange that the delivery of air to each mixing point commences somewhat before the delivery of lubricant so that the latter is discharged into an

established stream", and likewise "it may be advantageous for the delivery of air to continue a short time after the delivery of lubricant, so as to blow out any lubricant collected on the walls of the mixing zone and/or mixture flow path, and which might otherwise subsequently drip." (column 3, lines 5-12)." (*Point 7 of Paper Number 10*).

This citation from Brown '010 pertains to a system that incorporates air and lubricant lines that are delivered separately to a shared spray head. The air is already present, and the above referenced "purging" cycles would consist of nothing more than a slight modification to the method of use. Only the portion of the spray head that is ordinarily has a flowrate of air would be effected, and not the entire lubricant flow path.

In contrast, present invention refers to a dedicated purge gas connection and flow path. This purge gas would be "used to keep the first and/or second injectors clean, and to help cool each nozzle." (*Page 2, Line 29 through Page 3, Line 1 of instant application*) One of ordinary skill in the art, would not find that Brown '010 teaches the use of a purge stream to keep the entire injector clean since, as disclosed in Brown '010, the entire spray head is not cleaned by the early or late admission of air through the spray head. One of ordinary skill in the art would not find that Brown '010 teaches the use of a purge stream to cool each nozzle, since Brown '010 discloses a lubricant spray apparatus and not a burner.

Since one of ordinary skill in the art would not find that all the elements of claims 6, 13, 23, or 26 in the instant application have been either disclosed or suggested by Brown '120, Nicolas et al '974, Tischler '773, or Brown '010, either alone or in combination, it is believed that the basis of rejection deserves reconsideration and is respectfully traversed.

Claims 17-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown '120 in view of Nicolas et al '974 and Tischler '773, and in further view of Shepherd '166. Applicants respectfully submit that the present invention is not obvious in light of Brown '120 in view of Nicolas et al '974 and Tischler '773, and in further view of Shepherd '166.

The Examiner notes that Shepherd '166 discloses "the particular structural elements of the instantly recited nozzle." (*Point 8 of Paper Number 10*). Shepherd '166 discloses a burner that effectively utilizes three zones. The first zone is where the anchoring flames are produced by the mixed eddy currents (63 and 66) of the oxygen and fuel gas streams (respectively). These are turbulent, low velocity flames that provide stability for flames in the second zone. The second zone is where the higher velocity flames are produced by the mixing of oxygen and fuel gas streams (62 and 65 respectively). The third zone is where the liquid fuel (56) is atomized in zones one and two, and subsequently combusted.

Shepherd '166 teaches that "the high temperature resulting from the burning of the mixed gas and the atomized liquid in the combustion chamber 36 produces further turbulence in the combustion chamber and provides additional energy for atomizing and partially vaporizing the liquid fuel from the stream 67." (*Column 4, Lines 13 through 18*).

Thus, Shepherd '166 teaches a system wherein intentionally turbulent oxy-fuel combustion is used to promote the enhanced combustion efficiency of a secondary fuel. In contrast, the present invention does not teach promoting the enhanced combustion efficiency of a secondary fuel, but in contradistinction teaches intentionally reducing the combustion efficiency of the secondary fuel to the point where incomplete combustion is actually taking place.

The Examiner notes that:

“it would have been an obvious choice for one of ordinary skill in the art at the time the invention was made to substitute the nozzle of Shepherd for the nozzle in the modified apparatus of Brown, on the basis of suitability for the intended use, since both nozzles perform a substantially identical function, and it has been held that the substitution of known equivalent structures involves only ordinary skill in the art.” (*Point 8, Page 13 of Paper Number 10*).

Applicants respectfully disagree that one of ordinary skill in the art of carbon black production would look to the teachings of Shepherd '166, the design of which is directed in every way to combust the secondary fuel as completely and efficiently as possible. Applicants argue that both nozzles do not perform a substantially identical function, but actually are designed to perform incompatible functions.

Hence one of ordinary skill in the art would not find that all the elements of claims 17-21 in the instant application have been either disclosed or suggested by Brown '120, Nicolas et al '974, Tischler '773, or Shepherd '166, either alone or in combination, it is believed that the basis of rejection deserves reconsideration and is respectfully traversed.

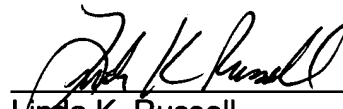
## CONCLUSION

Hence, it is submitted that one skilled in the art would have not have sufficient motivation to combine the prior art of record to obtain the present invention. The ground of rejection is believed to be unsustainable and should be withdrawn.

Accordingly, it is believed that the present application now stands in condition for allowance. Early notice to this effect is earnestly solicited.

Should the Examiner believe that a telephone call would expedite prosecution of the application, he is invited to call the undersigned attorney at the number listed below.

Respectfully submitted,



Linda K. Russell  
Registration No. 34,918

Date: 6/7/2004  
Air Liquide  
2700 Post Oak Blvd., Suite 1800  
Houston, Texas 77056  
(713) 624-8956 Phone  
(713) 624-8950 Fax



**CERTIFICATE OF MAILING UNDER 37 CFR 1.8(a)**

I hereby certify that this correspondence is being deposited with the  
United States Postal Service as first class mail in an envelope addressed to:  
Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this  
11<sup>th</sup> day of June, 2004.

  
\_\_\_\_\_  
Stacy Forte